What is claimed is:

1. A mixture comprising at least six chemical compounds each having a common purine or pyrimidine heterocyclic scaffold, said scaffold having at least two functionalizable atoms, said scaffold being substituted at at least one of said functionalizable atoms with a set of at least six different chemical substituients optionally connected to said heterocyclic scaffold by a tether moiety.

2. The mixture of claim 1 comprising at least ten chemical compounds.

3. The mixture of claim 1 comprising at least fifteen chemical compounds.

4. The mixture of claim 1 wherein said chemical compounds are within 20 mole percent of equimolarity in said mixture.

5. The mixture of claim 1 wherein said heterocyclic scaffold has at least three functionalizable atoms.

6. The mixture of claim 1 wherein said tether moiety is the same for each chemical substituient.

7. The mixture of claim 1 wherein at least one of the functionalizable atoms on said heterocyclic scaffold is nucleophilic.

8. The mixture of claim 1 wherein said tether moiety bears at least one functionalizable atom.

9. The mixture of claim 8 wherein at least one functionalizable atom on said tether moiety is nucleophilic.

10. The mixture of claim 8 wherein the at least one functionalizable atom on the tether moiety is substituted with a set of chemical substituients.

11. The mixture of claim 8 wherein the set of chemical substituients on the tether moiety are electrophilic.

12. The mixture of claim 1 wherein said chemical substituients are electrophilic.

13. The mixture of claim 1 wherein at least one functionalizable atom of said heterocyclic scaffold is chemically blocked.

14. The mixture of claim 1 wherein said chemical compounds are synthesized simultaneously in solution phase.

15. The mixture of claim 1 wherein said chemical compounds are synthesized simultaneously in solution phase through an interative synthetic process.

16. The mixture of claim 1 wherein said process comprises the blocking and deblocking of at least one functionalizable atom of said heterocyclic scaffold.

17. The mixture of claim 1 wherein at least some of said chemical compounds are subsequently reacted with a further reactant.

18. The mixture of claim 17 wherein said further reactant reacts with the heterocyclic portion of the chemical compounds.

19. The mixture of claim 1 wherein the heterocyclic portion of said chemical compounds is ring-opened, ring-closed, ring-expanded, bicyclized or altered subsequent to said substitution at said at least one of said functionalizable atoms.

20. A mixture comprising at least six chemical compounds having a common purine or pyrimidine heterocyclic scaffold, said scaffold having at least two functionalizable atoms, said heterocyclic scaffold being substituted at one of said functionalizable atoms with a set of at least six different chemical substituients optionally connected to said heterocyclic scaffold by a tether moiety; said heterocyclic scaffold being substituted at a second functionalizable atom with the same or a different set of at least six different chemical substituients optionally connected to said heterocyclic scaffold by a tether moiety.

21. The mixture of claim 20 wherein at least one of said sets of chemical substituients comprises at least ten species.

22. The mixture of claim 20 wherein at least one of said sets of chemical substituients comprise at least fifteen species.

23. The mixture of claim 20 wherein at least some of the chemical substituients is connected to said scaffold by tether moieties.

24. The mixture of claim 20 wherein said mixture exhibits sensible antibacterial effect.

25. The mixture of claim 20 wherein said mixture forms a library having activity against at least one bacterial, viral, nutritional or metabolic disease.

26. The mixture of claim 20 wherein said mixture form a library having activity against at least one agricultural pest, household pest, fungus, mold, mildew, or form of decay.

27 A method for preparing a combinatorial library comprising providing a heterocyclic scaffold molecule having at least two functionalizable atoms; reacting said scaffold with a set of at least six different chemical substituients to append said chemical substituients to the heterocyclic scaffold either directly or, optionally, via a tether moiety.

28. The method of claim 27 wherein the chemical compounds of said library are within 20 mole percent of equimolarity.

29. The method of claim 27 wherein said reaction is carried out in one reaction apparatus.

30. The method of claim 27 performed iteratively.